

# PATENT SPECIFICATION

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## DRAWINGS ATTACHED

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## (54) APPARATUS FOR FORMING A PACKAGE OF A PLURALITY OF CONTAINERS

(71) We, UNILEVER LIMITED, a company registered under the laws of Great Britain, of Port Sunlight, Wirral, Cheshire, England, do hereby declare the invention for which we pray that a patent may be granted to us and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to apparatus for forming a package in which a plurality of containers each having an outwardly extending rim, flange or the like, are held together by a carrier formed from a blank of cardboard or like material.

Apparatus is known which folds a blank around separate groups of bottles, cans or similar containers in such a way that the blank surrounds these containers at the top, bottom and the two longitudinal sides and the two sides of the blank are interlocked. Packaging containers with this apparatus is complicated because of the many folding operations which must all be inter-related. In another apparatus a blank is placed on the tops of the cans and after it has snapped into place over their beaded rims its two ends are interlocked at the top. In this case the blanks are pressed over the tops of the cans by means of folding blades which are moved simultaneously downwards and against the bodies of the cans, the blades forcing the blanks between the containers and rails which support the blanks beneath. This apparatus necessitates the containers being stationary during the movement of the folding blades and cannot be used for thin-walled deep-drawn plastics containers because of the movement of the folding blades against the container bodies.

In the present invention use is made of a carrier formed from a blank which is divided by fold lines into a centre panel which partially covers the tops of the containers, and two side panels, the two side panels having

slits or apertures arranged to engage under the rims of the containers.

According to the present invention there is provided apparatus for forming a package of a plurality of containers each having an outwardly extending rim or flange and a carrier formed from a blank provided with side panels and made of cardboard or like material, the apparatus comprising conveyor means adapted to convey the containers at a predetermined distance from each other and at a constant speed, means for supplying a blank and feeding it into a position overlying the containers being conveyed by the conveyor means, and a series of pressure members arranged to travel in pairs at the same speed as the conveyor means and in a path of travel convergent to the conveyor towards the direction of conveying so that pairs of pressure members progressively press against the side panels of the blank between adjacent containers to engage the side panels of the blanks at the undersides of the rims or flanges.

Thus the apparatus provides for forming composite packages whilst the containers are continuously moving on the conveyor. Preferably the conveyor means includes support members each adapted to engage two adjacent containers both in the direction of movement of the conveyor and transverse to said direction of movement. This arrangement of support members makes it possible for thin-walled thermoplastic containers to be handled without the containers being deformed.

The pressure members are conveniently carried by two rollers chains each located above and opposite sides of the conveyor means.

To assist in engaging the side panels of the blanks below the flanges of the containers, pusher members can be slidably mounted to the pressure members and operating means can be provided adapted to cause the pusher

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[Price 25p]

members of pairs of pressure members to move inwardly towards one another to assist in engaging the side panels of the blanks below the flanges of the containers.

- 5 The blanks can be taken successively from a supply store in known manner and each be fed into the position overlying containers on the conveyor means by a second conveyor means, the second conveyor means being provided with blank transport members spaced 10 apart at a greater distance than the length of the blank, the blank transport members pushing the blank along guide rails disposed above and aligned with the path of travel of the 15 containers, drive means for driving the second conveyor means at a greater speed than that of the conveyor means for the containers, a release cam to disengage the blank from the blank transport members and push the blank 20 to abut with the previous blank, and a roller adapted to press the blank onto the tops of the containers to synchronise the speed of travel of the blank with that of the containers as the blank is fed into the overlying position 25 abutting the previous blank. The speed of the second conveyor means is higher than the speed of the conveyor means for the containers because of the space between the blanks on the second conveyor means necessitated by the transport members whereas the blanks are 30 abutting one another when in position overlying the tops of the containers.

Embodiments of the invention will now be more particularly described with reference to the accompanying diagrammatic drawings in which:

Figure 1 is a plan view of a blank;

Figure 2 is a perspective view of a package;

Figure 3 is a side elevation of apparatus for 40 feeding blanks to overlie the containers;

Figure 4 is a side elevation of apparatus showing the conveyor means for containers and the pressure members;

Figure 5 is a similar view to that of Figure 45 4 showing the pressure members converging with conveyor;

Figure 6 is a sectional elevation along the line VI—VI in Figure 4;

Figure 7 is a sectional elevation along the 50 line VII—VII in Figure 5; and

Figures 8 and 9 are sectional elevations similar to Figures 6 and 7 showing an alternative embodiment.

A carrier is formed from a blank 1 as 55 shown in Figure 1 divided by fold or score lines 8 and 9 into a centre panel 2, two upper side panels 3 hinged along the fold lines 8 to opposite edges of the centre panel, and two lower side panels 4 hinged to each 60 of the upper side panels 3 along the fold lines 9. The upper side panels 3 are formed with openings 5 of a size dependent upon the size of the rims of the containers to be packaged, the fold lines 8 being slit at 5a from the 65 openings 5. Weakening lines 6 in the upper

side panels 3 define gussets 7 on each side of the opening 5. Further weakening lines 10 extend across the blank so that individual containers can be readily separated from a package. 70

Figure 2 shows a completed package in which the carrier is erected to hold together three containers 11, for example tubs for yoghurt or fruit juice, having an outwardly extending rim or flange 12, and a shoulder 13. 75 The centre panel 2 of the carrier partially covers the tops of the containers, the rims 12 extending through the slits 5a so that the gussets 7 grip beneath the rims 12, the shoulders 13 extending through the apertures 5 so that the bottom edges of the apertures 5 engage with the bottom edges of the shoulders 13. 80

Referring now to Figure 3, there is provided a conveyor means for containers 11 comprising a conveyor belt 21 which, as shown in Figure 4, is provided with a number of support members 22 for the containers. The support members are shaped to engage two adjacent containers both in the direction of 90 movement of the conveyor 21 and transverse to the direction of movement of the conveyor. The support members are arranged in such a way as to enter between two adjacent containers. Thus the support members support 95 two successive containers and make it possible to handle even thin-walled thermoplastic containers in the apparatus without the containers being deformed.

A second conveyor means comprising a 100 roller chain 32 is provided with blank transport members 33 which extend between upper and lower pairs of retaining rails 35 and 36 which are separated by a gap wide enough to accommodate the thickness of the blanks. 105 Outside of each of the retaining rails 36 are a pair of folding rails 34 (only one of which is shown) which terminate at approximately the same point as the retaining rails 35 and 36. 110

A release cam 38 attached to a wheel 37 is timed to approach the ends of the retaining rails 35, 36 as the transport member 33 reaches the ends of the retaining rails. Downstream of the retaining rails in the direction 115 of movement of the conveyor 21 is a pressure roller 39 mounted to freely rotate at one end of an arm 40, the arm 40 being pivoted to move in the direction of arrow 'A'.

Downstream of the roller 39 as shown in 120 Figures 4 to 7, there are provided two roller chains 23, which are guided by members 24. Secured to each of the roller chains 23 are a series of pressure members 25 the inner faces 25a of which are tapered or wedge shaped so as 125 to be outwardly divergent towards the conveyor 21 as shown in Figures 6 and 7. Guide rails 26 are provided at each side of the conveyor 21 and effectively form continuations of the rails 34. 130

Further downstream as shown in Figure 5, the members 24 converge towards the path of travel of the conveyor 21 so that the pressure members 25 pass between the guide rails 26, the pressure members being vertically above the support members 22 on the conveyor 21.

In operation blanks are taken from a supply store in known manner and placed between the retaining rails 35 and 36 where they are in turn engaged from behind by transport members 33 attached to the roller chain 32 and pushed towards the ends of the retaining rails shown in Figure 3. As a blank is pushed along by the transport member the folding rails 34 engage the sides of the blank and prefold the lower side panels 4 downwards along the hinge lines 9.

When the blanks reach the ends of the retaining rails the blanks drop onto the tops of containers 11 being conveyed by the conveyor 21. The roller chain 32 travels at a faster speed than the conveyor 21. The release cam 38 pushes a blank downwards and away from the transport member and then forwards. Because the blank in front is being conveyed at the speed of the conveyor 21 the leading edge of the blank pushed by the release cam 38 is pushed up again the rearward edge of the blank in front. As soon as the blank has been pushed away from the blank transport member 33 by the release cam 38 the pressure roller 39 is pivoted downwards to press the blank against the tops of the containers and reduce the speed of the blank to that of the conveyor 21. The roller chain 32 travels at a greater speed than the conveyor 21 because the presence of the blank transport members 33 in the roller chain necessitates a gap between successive blanks when they are being pushed by the blank transport members, whereas the blanks abut when in position on the containers being conveyed by the conveyor 21. The pressure roller 39 is pivoted upwards before the next blank is pushed forward by the release cam.

When a blank has come to rest on top of the containers and in contact with the preceding blank as shown in Figure 4, the conveyor 21 conveys the containers and the blank forwards until, as shown in Figure 5, the path of travel of the pressure members 25 which are travelling at the same speed as the conveyor 21 converges downwards towards the conveyor 21 so that the pressure members press on the side panels of the blanks between successive containers. The guide rails 26 locate the blanks centrally above the containers and prevent the lower side panels 4 from springing upwards as the pressure members press on the upper side panels 3.

The downward movement of the pressure members combined with the shape of the inner faces of the pressure members presses the side panels of the blank downwards and

inwards to erect the carrier to hold the containers in a package as shown in Figure 2. The gradual lowering of the pressure members result in gentle handling of the containers and also serves to position the blanks into their exact positions over the containers. The use of two separate pressure members has the advantage of allowing the distance between the pressure members to be adjusted, if required, in accordance with the diameter of the containers and the width of the central panel of the carrier. This allows the apparatus to handle containers of a different size provided the distance between the containers remains the same.

To prevent the pressure members being deflected outwards during their downward movement it is expedient to fit support rails 27 as shown in Figures 6 and 7 to support the pressure members against deflection. The pressure members 25 may also be rounded or tapered at the front and back to assist in erecting the carrier.

Instead of the guide rails 26, a suitable extension 28 can be formed on the pressure members as shown in Figures 8 and 9.

Where the containers are closed by a lid sealed to the top of the outwardly extending flange 12, the blank can be drawn over the flange simply by the downward movement of the pressure members 25 so that its gusset corners 7 lock firmly under the flange 12. If, on the other hand, the containers are provided with a lid, for example of aluminium foil, which is beaded round the flange, the gusset corners 7 may have to be pressed against the tub beneath the flange, that is to say into the beaded aluminium foil. In this case the pressure members can be modified as shown in Figures 8 and 9 by the provision of pins 29 or similar members slidably mounted in the pressure members and biased by springs 30 to the position shown in Figure 8. As the pressure members reach the appropriate position the pins enter into grooves 31 in the guide rails 27 and are pushed forwards to press the gusset corners 7 of the carrier against the container beneath the flange.

The apparatus can easily be adapted to form packages holding a different number of containers as it is not necessary to separate the groups of containers to be held together by a single carrier.

#### WHAT WE CLAIM IS:—

1. Apparatus for forming a package of a plurality of containers each having an outwardly extending rim or flange and a carrier formed from a blank provided with side panels and made of cardboard or like material, the apparatus comprising conveyor means adapted to convey the containers at a predetermined distance from each other and at a constant speed, means for supplying a blank and feeding it into a position overlying the containers



being conveyed by the conveyor means, and a series of pressure members arranged to travel in pairs at the same speed as the conveyor means and in a path of travel convergent to the conveyor towards the direction of conveying so that pairs of pressure members progressively press against the side panels of the blank between adjacent containers to engage the side panels of the blank at the underside of the rims or flanges.

2. Apparatus according to Claim 1, in which the conveyor means includes support members each adapted to engage two adjacent containers both in the direction of movement of the conveyor and transverse to said direction of movement.

3. Apparatus according to Claim 1 or Claim 2, in which the pressure members are carried by two rollers chains each located above and on opposite sides of the conveyor means.

4. Apparatus according to any of the preceding claims including pusher members slidably mounted to the pressure members and operating means adapted to cause the pusher members of pairs of pressure members to move inwardly towards one another to assist in engaging the side panels below the flanges of the containers.

5. Apparatus according to any of the preceding claims in which the means for feeding

the blanks into the position overlying the containers being conveyed by the conveyor means includes a second conveyor means provided with transport members spaced apart at a greater distance than the length of the blank, the transport members pushing the blank along guide rails disposed above and aligned with the path of travel of the containers, drive means for driving the second conveyor means at a greater speed than that of the conveyor means for the containers, a release cam to disengage the blank from the transport members and push the blank to abut with the previous blank, and a roller adapted to press the blank onto the tops of the containers to synchronise the speed of travel of the blank with that of the containers as the blank is fed into the overlying position abutting the previous blank.

6. Apparatus for forming a package substantially as hereinbefore described with reference to Figures 1 and 7 of the accompanying drawings.

7. Apparatus for forming a package substantially as hereinbefore described with reference to Figures 1 to 9 of the accompanying drawings.

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FIG.1.

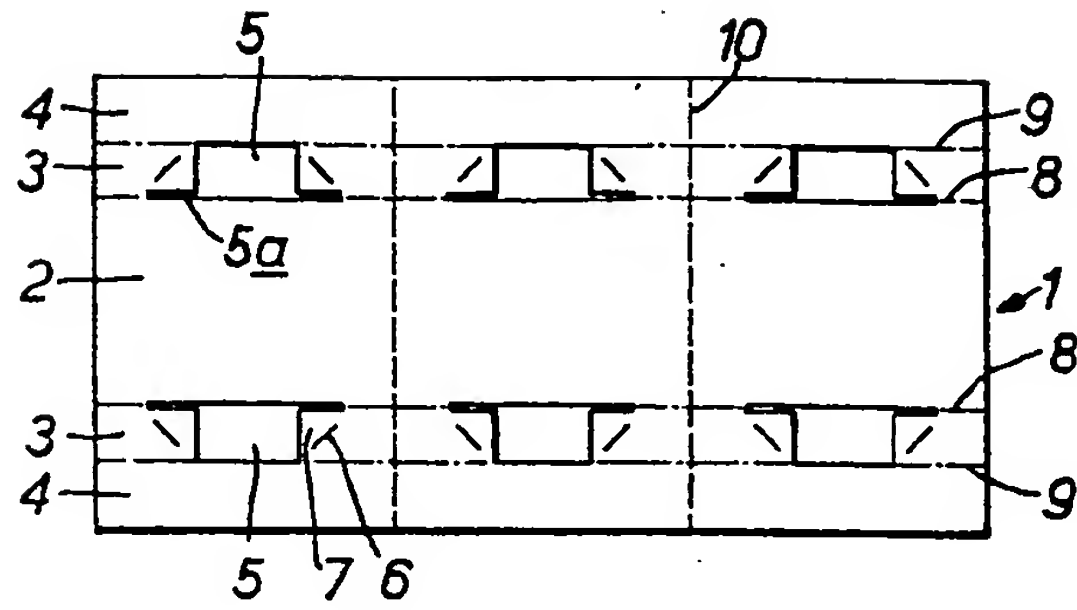
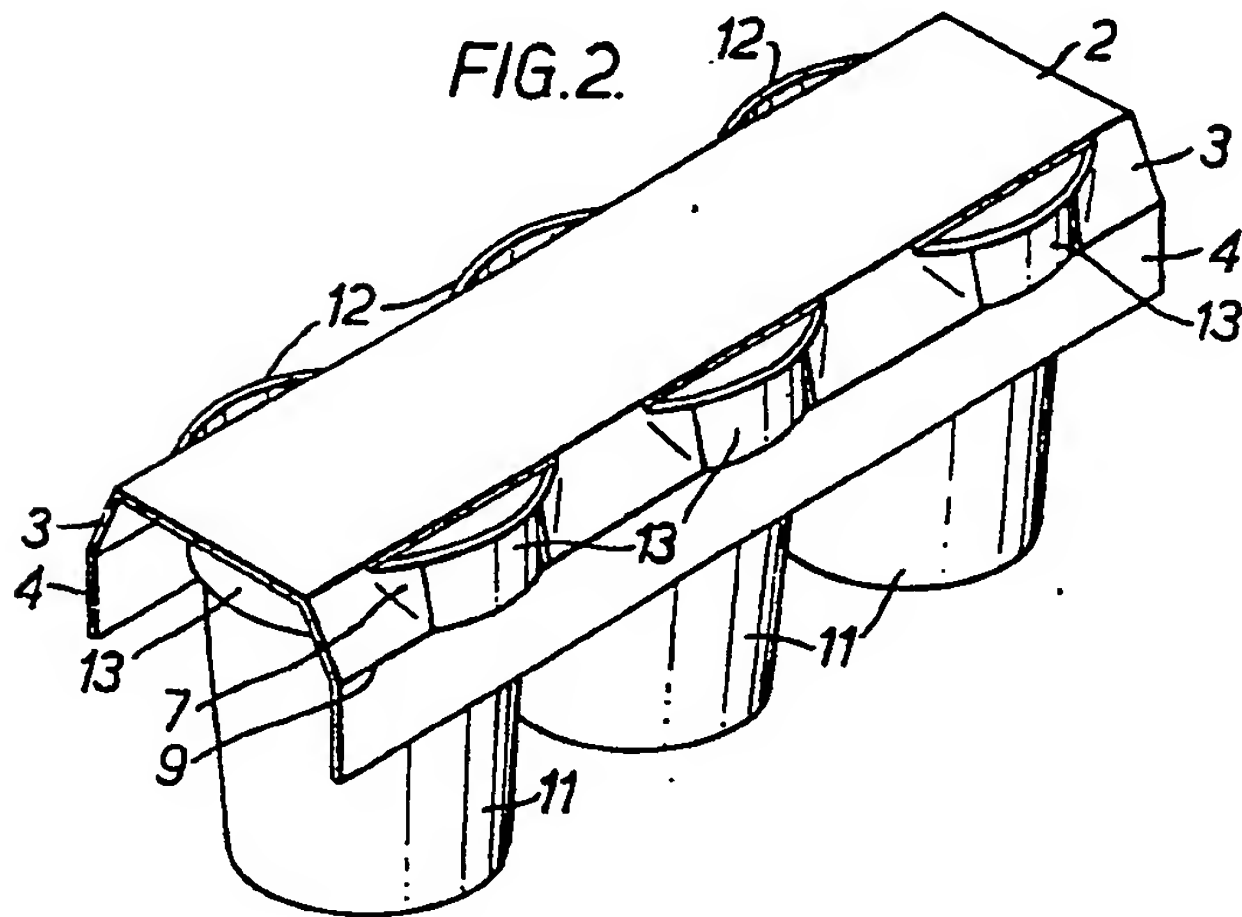


FIG.2.



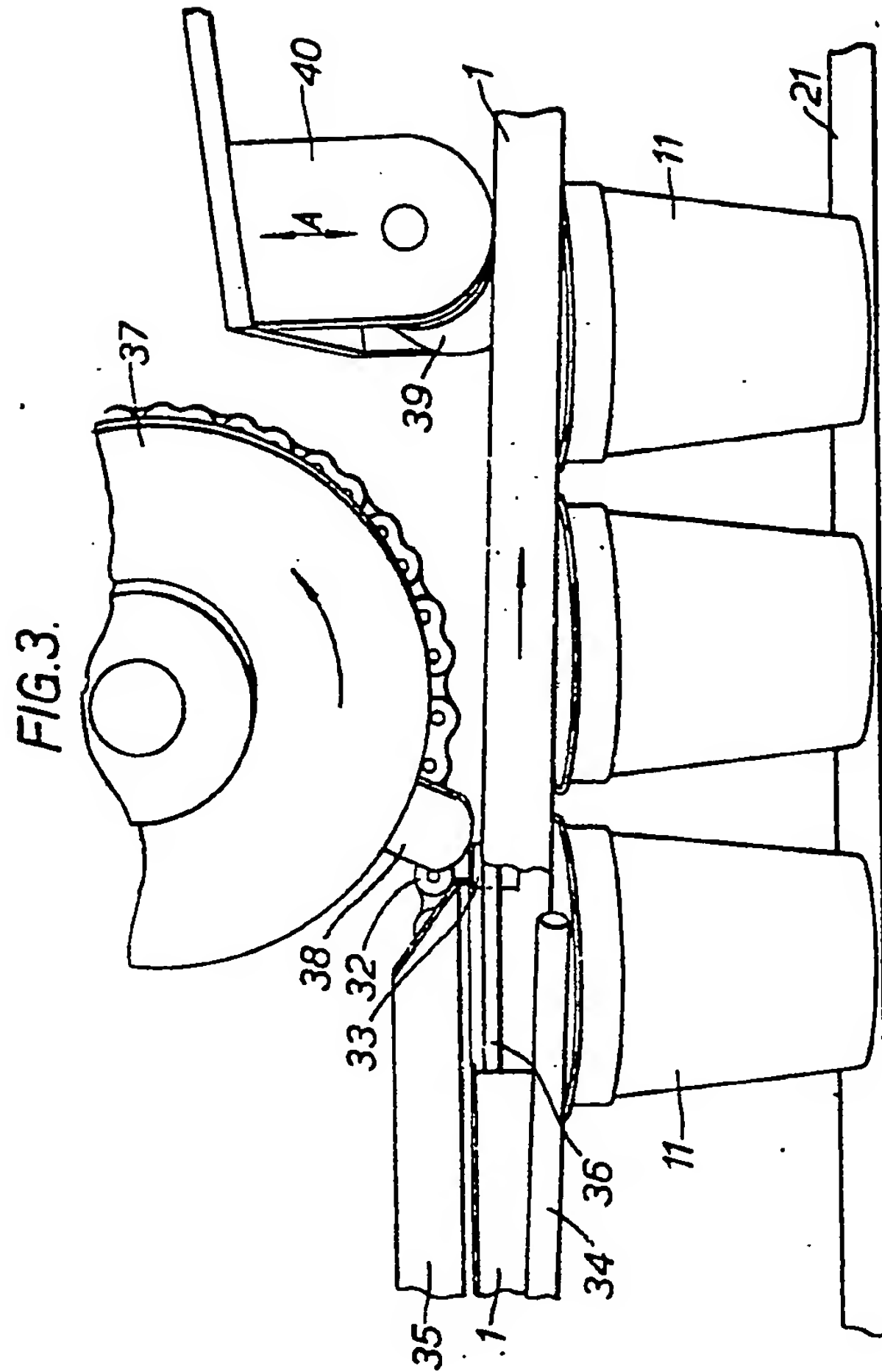
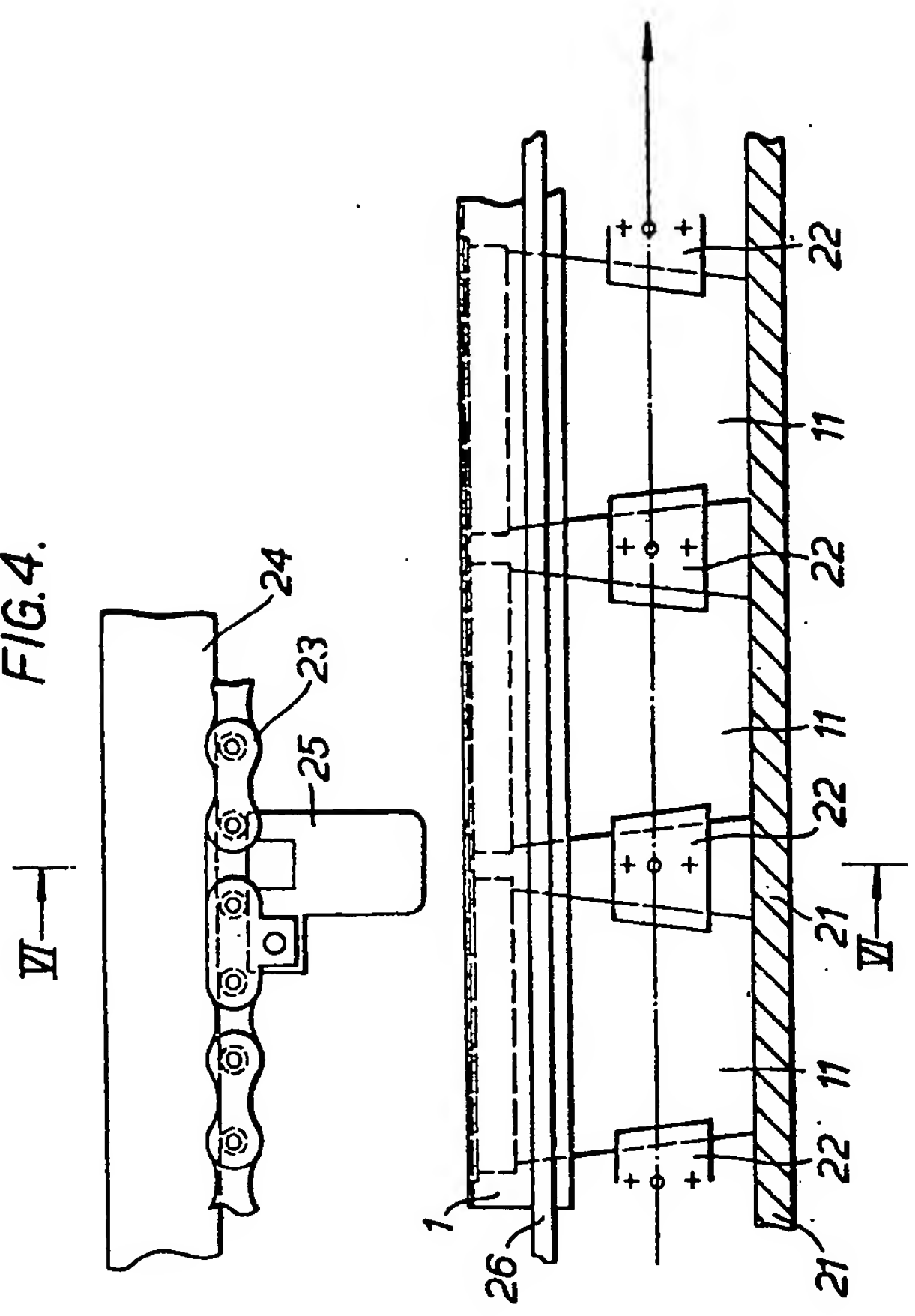
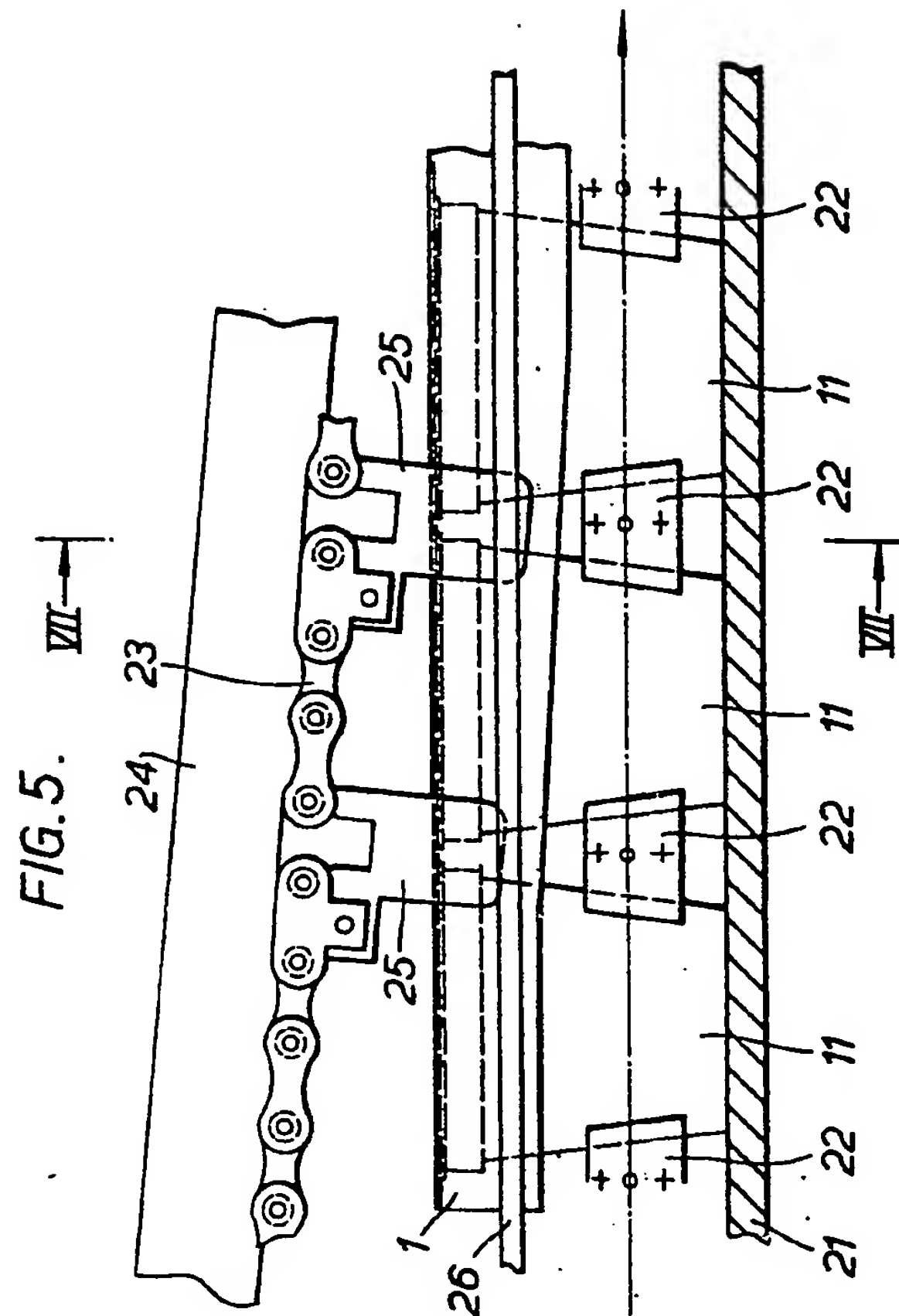


FIG. 4.







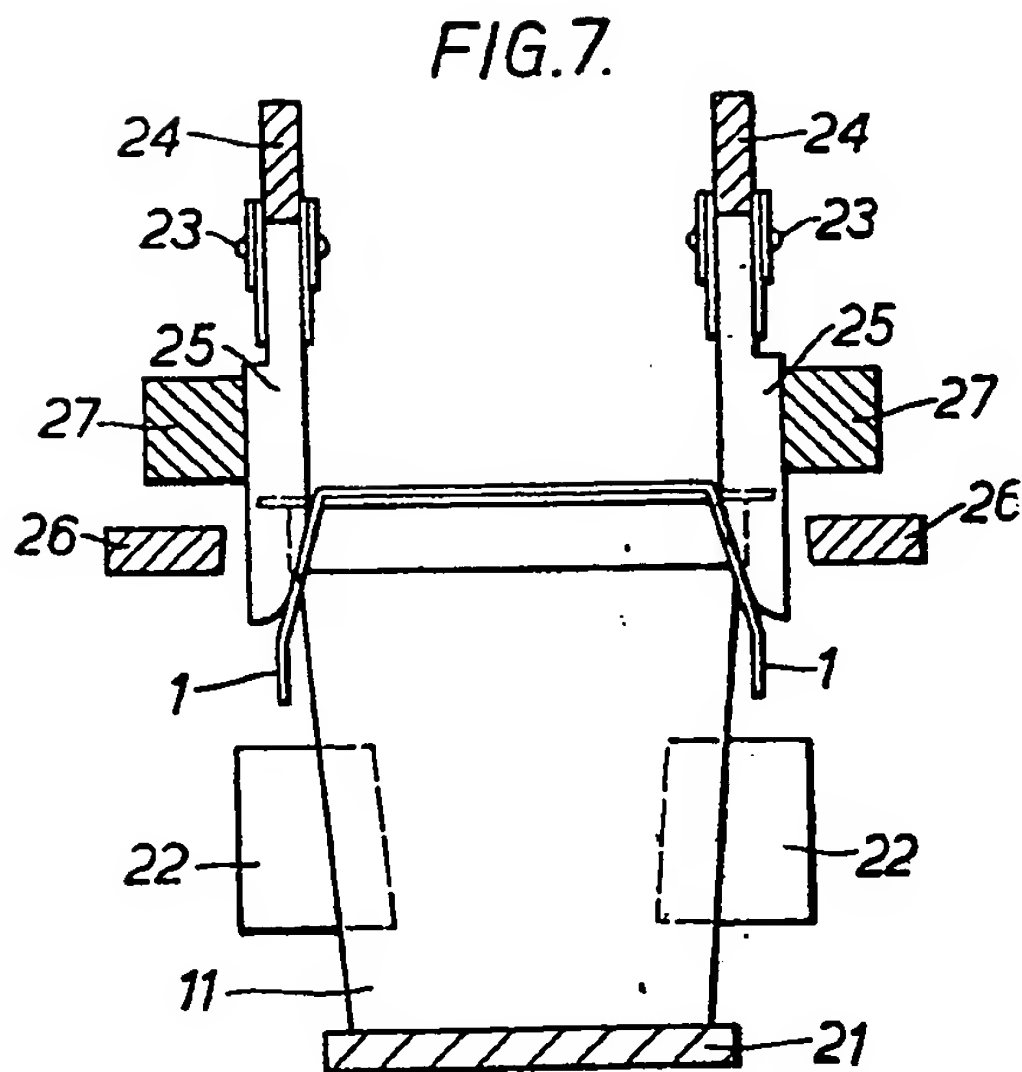
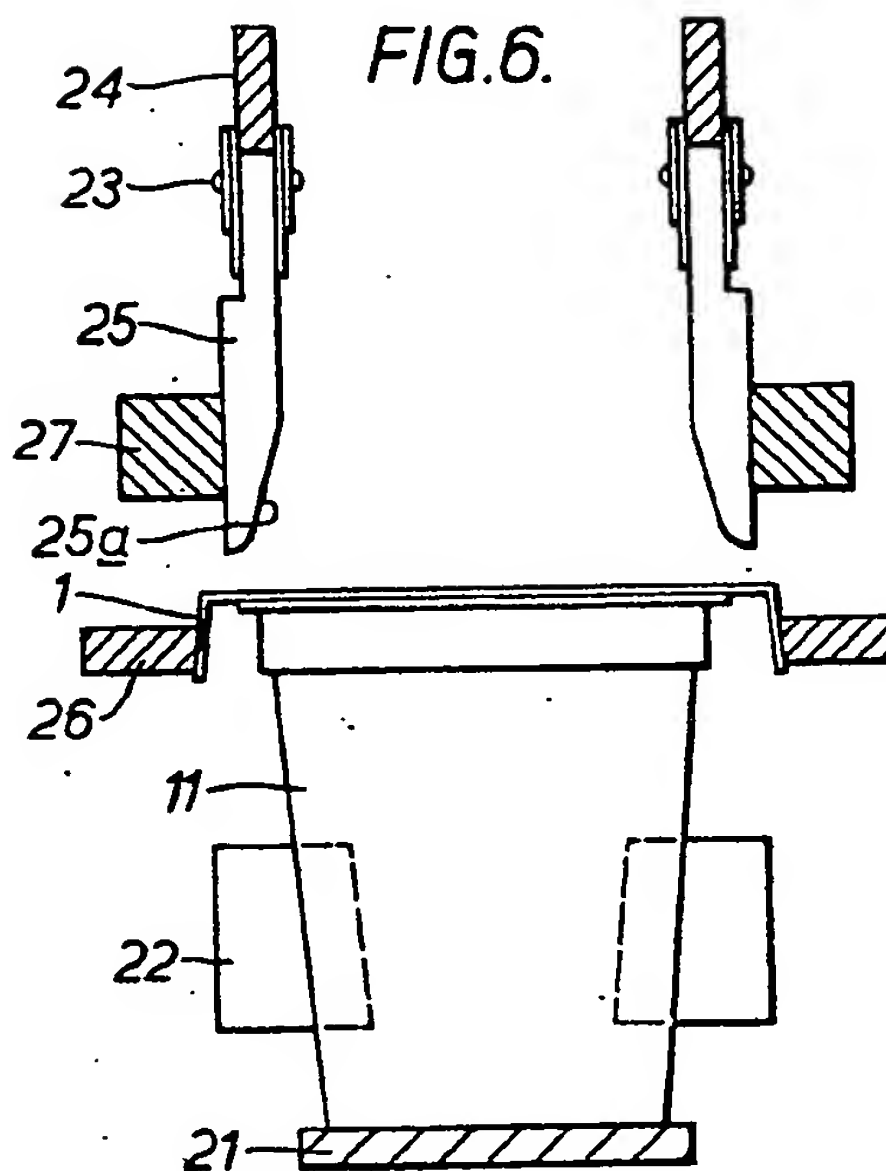


FIG.8.

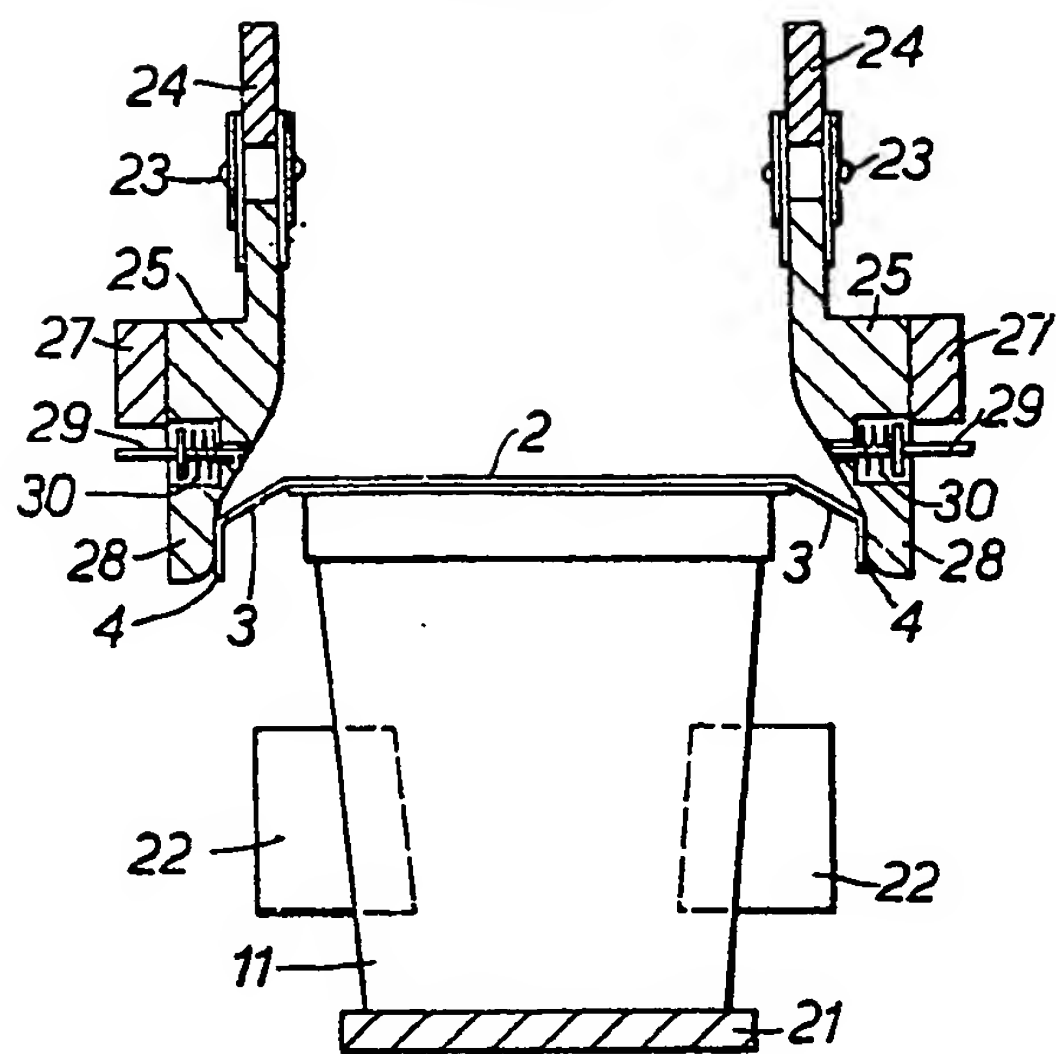


FIG.9.

